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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/690,146      | 10/21/2003  | Hui Hugh Wang        | 10541-1848          | 3913             |

7590 04/15/2004

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| EXAMINER |
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JULES, FRANTZ F

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| ART UNIT | PAPER NUMBER |
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3617

DATE MAILED: 04/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/690,146

Applicant(s)

WANG ET AL.

Examiner

Frantz F. Jules

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 10 is/are rejected.
- 7) ☒ Claim(s) 5-9 and 11-16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to because:

On page 6, line 13, the specification calls for reference number 58 to be "bell housing inner surface, Fig. 1 of the drawings shows reference number 58 pointed to a seal between the outboard joint and the bearing.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Iarrera (US 6,203,441).

A wheel end assembly comprising: a bearing shaft (16), see col. 2, lines 34-35, having an inboard end and an outboard end, a wheel hub (3) mounted onto said outboard end of said bearing shaft;

a detachable outboard joint (33) mounted onto said inboard end of said bearing

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shaft, and a wheel bearing (12) mounted onto said bearing shaft between said inboard end and said outboard end, said wheel bearing including a knuckle flange (14) having an inner diameter that defines an inboard outer race and an outboard outer race, an inboard inner race and an outboard inner race supported on said bearing shaft, and a plurality of bearing elements (8), a first portion of said bearing elements being positioned between said inboard outer race and said inboard inner race and a second portion of said bearing elements being positioned between said outboard outer race and said outboard inner race; and

an inboard bearing ring (20), said inboard inner race being formed within said inboard bearing ring, said inboard bearing ring including an engagement portion extending axially inward and engaging said detachable outboard joint;

said inboard end of said bearing shaft including a flange portion (24), said flange portion providing a support to keep said inboard bearing ring, and said wheel bearing positioned onto said bearing shaft and inducing a pre-load into said wheel bearing such that said pre-load is maintained on said wheel bearing when said outboard joint is removed from said wheel end assembly.

The outboard inner race is integrally formed within the bearing shaft in accordance with claim 2.

The wheel hub includes a brake rotor having a braking ring, said braking ring and said brake rotor being integrally formed with one another in accordance with claim 3.

The wheel hub and said bearing shaft are integrally formed with one another in accordance with claim 4.

The inboard bearing ring includes a splined inner diameter (30) that engages said bearing shaft such that said inboard bearing ring is rotationally locked onto said bearing shaft in accordance with claim 10.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bertetti'075 (US 5,536,075) in view of Bertetti et al'565 (US 5,782,565).

**Claims 1-4**

Bertetti'075 discloses a wheel end assembly comprising a bearing shaft (19) having an inboard end and an outboard end, a wheel hub (13) mounted onto said outboard end of said bearing shaft; a detachable outboard joint mounted onto said inboard end of said bearing shaft, and a wheel bearing (7) mounted onto said bearing shaft between said inboard end and said outboard end, said wheel bearing including a knuckle flange (11) having an inner diameter that defines an inboard outer race and an outboard outer race, an inboard inner race and an outboard inner race supported on said bearing shaft, and a plurality of bearing elements (9), a first portion of said bearing elements being positioned between said inboard outer race and said inboard inner race and a second portion of said bearing elements being positioned between said outboard

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outer race and said outboard inner race; and an inboard bearing ring (15) supported by a flange portion on the shaft, said inboard inner race being formed within said inboard bearing ring, said inboard bearing ring including an engagement portion extending axially inward and engaging said detachable outboard joint; and said wheel bearing positioned onto said bearing shaft and inducing a pre-load into said wheel bearing such that said pre-load is maintained on said wheel bearing when said outboard joint is removed from said wheel end assembly.

The outboard inner race is integrally formed within the bearing shaft in accordance with claim 2.

The wheel hub includes a brake rotor having a braking ring, said braking ring and said brake rotor being integrally formed with one another in accordance with claim 3.

The wheel hub and said bearing shaft are integrally formed with one another in accordance with claim 4.

Bertetti'075 discloses all of the features as disclosed above but does not disclose a wheel end assembly comprising a flange portion at the inboard end of the bearing shaft. The general concept of providing a flange portion at the inboard end of a bearing shaft is well known in the art as illustrated by Bertetti et al'565 which discloses the teaching of a flange portion (9) at the inboard end of a bearing shaft in a wheel end assembly. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Bertetti'075 to incorporate a flange portion at the inboard end of the bearing shaft as taught by Bertetti et al'565 in order to reduce the number of operations and assembly costs of the wheel hub unit.

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6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bertetti'075 (US 5,536,075) and Bertetti et al'565 (US 5,782,565), as applied to claim 1, and in view of Beasley et al (US 6,668,888).

Bertetti'075 and Bertetti'565 teach all the limitations of claim 10 except for a for a splined connection between the ring the shaft. The general concept of providing a splined connection between a shaft and a hub is well known in the art as illustrated by Beasley et al which disclose the teaching of a splines (18a) between a shaft (12b) and a ring (16). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Bertetti'075 to incorporate a splined connection between the ring and the shaft of his advantageous wheel end assembly as taught by Beasley et al in order to facilitate assembly of the ring on the shaft while achieving a rugged construction in the wheel hub unit.

#### ***Allowable Subject Matter***

7. Claims 5-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the references of record suggests a wheel end assembly wherein the housing inner surface includes a polygon shape for engaging an outer surface of an inboard bearing ring having a polygon shape.

8. Claims 11-16 stand allowable. None of the references of record suggests a wheel end assembly wherein the housing inner surface includes a polygon shape for engaging an outer surface of an inboard bearing ring having a polygon shape.

#### ***Conclusion***

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9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Neibling et al are cited to show related wheel end assembly comprising a shaft with a flange portion at the end.

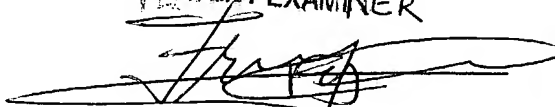
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frantz F. Jules whose telephone number is (703) 308-8780. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph S. Morano can be reached on (703) 308-0230. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Frantz F. Jules  
Examiner  
Art Unit 3617

FFJ

FRANTZ F. JULES  
PATENT EXAMINER  




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April 12, 2004